

# How do you measure success?

## Exploring two factors, debunking one myth

**YOU** have probably heard it, and you may have lived it. Business is slow, layoffs have left you shorthanded, maintenance is a thing of the past, and upgrades are on hold. The reason for the layoffs, lack of maintenance, and postponed upgrades is always the same: “We have no money!”

Strangely, it’s often the same when business is good. “We can’t shut down the line for anything,” and this includes maintenance, mill alignment, roll inspections, and, well, you name it. More often than not the plant is plagued with poor planning that results in frequent changeovers, and mill uptime hovers around 50 percent during a good week. When things break down or the mill condition limits weld speeds, mill uptime gets worse.

This is a painful work environment. If conditions don’t change, the facility will close, thus solving the problem. This isn’t a good way to solve the problem, of course. The other way is to break the cycle—the “We-have-no-money, therefore-we-delay-maintenance, therefore-the-mill-breaks-down-in-the-middle-of-a-product-run, therefore-we-can’t-make-money, therefore-we-have-no-money” cycle.

Market forces push just-in-time delivery as a necessity, but the typical tube mill isn’t a quick-change machine, so herein lies a basic problem. How does this company break the cycle?

**Face the facts.** Recognize the problem. Don’t wait until the mill stops to realize the situation is a full-blown crisis. Labor without profit, enjoyment, or satisfaction is just drudgery, and all who work under such conditions will leave the sinking



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ship as soon as possible. High turnover is a sign that current production practices are not working, or are not practicable. Turnover costs money because new hires are not as efficient as trained employees.

**Develop ways to work efficiently.** Recognize the only real indicator of manufacturing success: uptime coupled with line speed. The No. 1 reason for failing to achieve high uptime is ill-maintained equipment. This is closely followed by the No. 2 most common error: inappropriate use of production equipment—that is, asking the equipment to do things it wasn’t designed to do or operators trained for. Both errors increase changeover time and drive up scrap losses. Long changeover times indicate failures in planning, maintenance, and training. Scrap is a burden that unbalances the profit equation.

Every tube or pipe mill staff must focus on the line speed and uptime (actual run hours versus maintenance or changeover hours). This means grouping tube ODs, wall thicknesses, and grades to

minimize the number of changeovers and thereby create time for preventive maintenance. For more information on this, see “Tube Mill Economics 102—It’s the plan that makes success!” in the December 2004 issue of *TPJ-The Tube & Pipe Journal*, p. 32.

**Production does not indicate success. Profit does.** Now is the time for all good men to come to the aid of their country! I’ve always wanted to say that—it sounds good, righteous, and positive. And it’s true. Now is the time to take an unvarnished look at your performance. Profit drives the process, so everyone must start by scrutinizing the numbers. Some of these things may be beyond your scope of responsibility, but someone must understand that the phrase “We’ll make it up in volume” is flat wrong. It’s a myth at best, and a quick way to bring down a company at worst. Just ask anyone at Rubbermaid, a company that bowed to Wal-Mart’s demand for special colors and special pricing, wrapped in the lure of millions of units shipped each month. Wal-Mart later switched to a foreign supplier, and Rubbermaid, once a recognized icon, is nearly gone.

Do not offer discounts and think you will ever make it up in volume. Small lot orders must bring a higher sell price or they are losers! Fire both the salesman who sells on price and the lowball, short-lead-time customers who won’t pay a premium for your increased downtime. Or, if the customer pays his bills and orders with reliable frequency, bite the bullet and run this order for stock if you can peddle it in a reasonable time so you control the schedule.

FIVE PRODUCTION SCENARIOS					
Parameter	Example 1	Example 2	Example 3	Example 4	Example 5
Tube OD, Inches	3.000	3.000	3.000	3.000	3.000
Wall Thickness (WT)	0.0700	0.0700	0.0700	0.0700	0.0700
WT Variation -5%	0.0737	0.0737	0.0737	0.0737	0.0737
Calculated Section Area	0.6774	0.6774	0.6774	0.6774	0.6774
Calculated Weight per Foot	2.3029	2.3029	2.3029	2.3029	2.3029
Steel Cost per Ton	\$600	\$600	\$600	\$600	\$600
Feet per Ton	825	825	825	825	825
Line Speed (FPM)	100	100	200	133.34	175
Uptime, Percent	100%	50%	50%	75%	80%
Hours per Ton	0.1447	0.2895	0.1447	0.1447	0.1034
Labor With Burden	\$45	\$45	\$45	\$45	\$45
Crew Size	2	2	2	2	2
Cost per Ton, Material and Labor	\$613.03	\$626.05	\$613.03	\$613.03	\$609.31
Markup, Percent	30%	30%	30%	30%	30%
Sell Price per Ton	\$875.75	\$875.75	\$875.75	\$875.75	\$875.75
Shift Length, Hours	8	8	8	8	8
Shift Length Minus Lunch Time and Breaks	7	7	7	7	7
Production Hours	7	3.5	3.5	5.25	5.25
Steel Tons Required	48.36	24.18	48.36	48.36	67.70
Feet Tube Produced	39,900	19,950	39,900	39,900	55,860
Cost (Mat. + Labor)	\$29,736	\$15,228	\$29,736	\$29,737	\$41,343
Total Sell Price, Dollars	\$42,352	\$21,176	\$42,352	\$42,353	\$59,293
Total Profit, Dollars	\$12,616	\$5,948	\$12,616	\$12,616	\$17,950
Profit, Percentage Change	100%	-52.85%	0.00%	0.00%	42.28%

Figure 1

**Need help? Get help.** Sometimes it is hard to find the time and the energy to tackle this problem on your own. Find a mentor, visit sister plants, talk to a competitor if you have to, network, call in a consultant, but somehow get some help. Your job and everyone else's is on the line. Understand the metrics of your operation and use them to schedule, to set minimum lot sizes (production runs), and plan for maintenance. You must have a reliable production line and know its limits. Push yourself to reduce changeover and setup times and thereby reduce losses, and learn how to justify spending money to improve operations.

The following examples illustrate the

problem. All of these examples are based on production of a high-frequency-welded carbon steel tube, 3 inches OD by 0.070 in. wall thickness. The steel cost, labor cost, and sell price per ton are fixed for the study so we can see the effect of uptime versus mill speed (see Figure 1).

- Scenario 1—100 percent efficiency with no changeovers
- Scenario 2—50 percent uptime when making the same product at the same line speed as in Scenario 1
- Scenario 3—50 percent uptime combined at 200 FPM
- Scenario 4—75 percent uptime at 133.3 FPM

- Scenario 5—80 percent uptime at 175 FPM

1. The uptime is 100 percent and the line speed is 100 feet per minute (FPM), and the total profit is \$12,585.30. This is a baseline for the other scenarios.

2. The second scenario shows what happens when maintenance is postponed or canceled altogether. Something on the mill breaks in the middle of a production run, and it takes 3.5 hours to get the mill up and running again. This takes the uptime down to 50 percent and the profit down by 52.8 percent of its former level.

3. The third scenario shows how fast the line would have to run to compensate

for 50 percent downtime. The speed, 200 FPM, is beyond the capability of many older tube mills, so this is not a workable solution. It takes a lot of speed to make up for poor planning and poor maintenance.

4. The fourth scenario is the middle ground. Although the mill didn't run during the entire shift, the uptime was not too bad at 75 percent. This leads to a question: What mill speed will achieve the same profit as it did at 100 percent efficiency and 100 FPM? The answer is 133.3 FPM. Now that's practicable with most well-maintained equipment.

5. The fifth scenario is an answer to this question: How much more profit could the company make if the mill ran at 175 FPM and the uptime was just a little bit better at 80 percent? The answer is an additional \$5,334 during every eight-hour shift, when compared to the baseline. Can you afford to align the tube mill

so it will run at 175 FPM? The decision should be easy. If the cost of an alignment were \$3,000, it would pay off in less than one shift and continue to add more profits thereafter until it became time to align the mill again.

You buy new tires for your car when they wear out. You align the front end so you can both go down the road in a straight line and make the tires last. Why don't you align your tube mill? Because it costs too much and it takes away production time? If that's the answer in your plant, use the numbers to prove your point. The same thing applies to increasing mill horsepower (to increase speed), the weld unit capacity (to increase speed and reliability), or cutoff capabilities (more cuts per minute so you can run shorter parts at higher speeds).

Each tube or pipe mill has certain advantages and disadvantages. Learn the mill metrics so you can play to your

strengths and minimize your weaknesses. When productivity drops to 50 percent uptime, know that you are in trouble unless customers are paying more for your production. You can't make up the difference by doing more changeovers or cutting prices. **TPJ**

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